

mRNA Vaccines

How do they work?

Covid 19 virus and its spike proteins

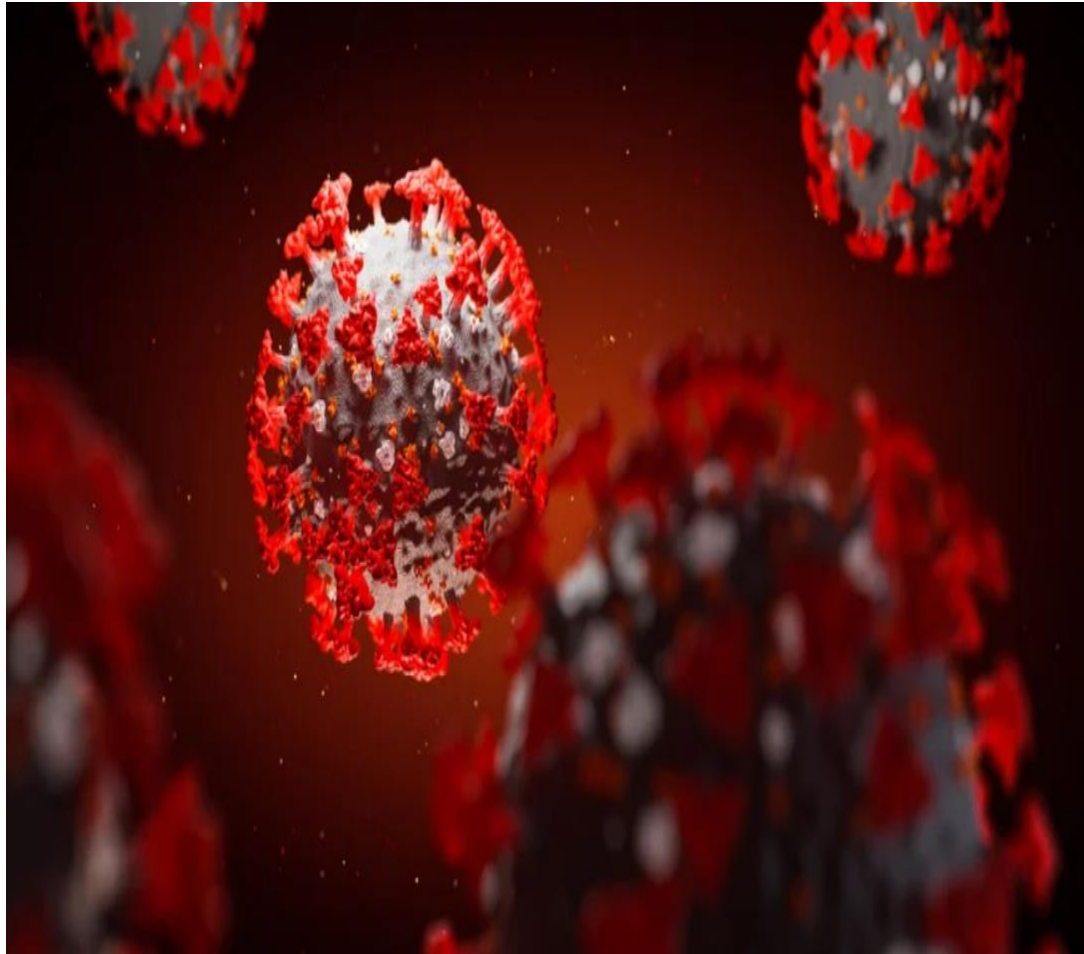
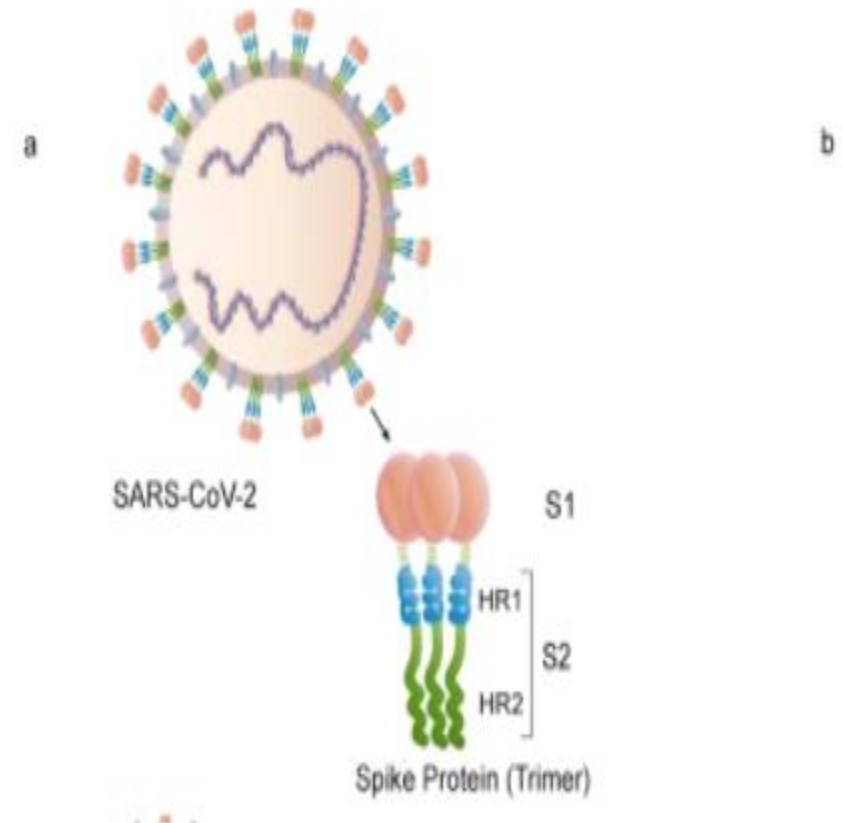
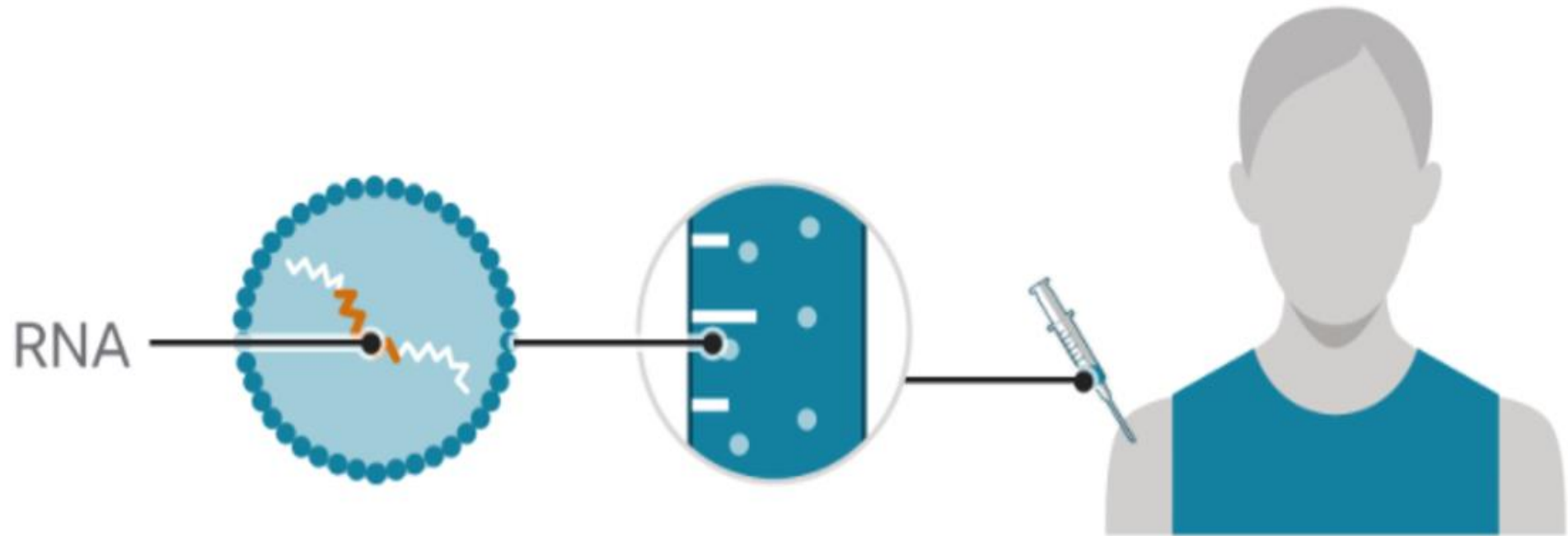


Fig. 1: Schematic of the SARS-CoV-2 S protein.

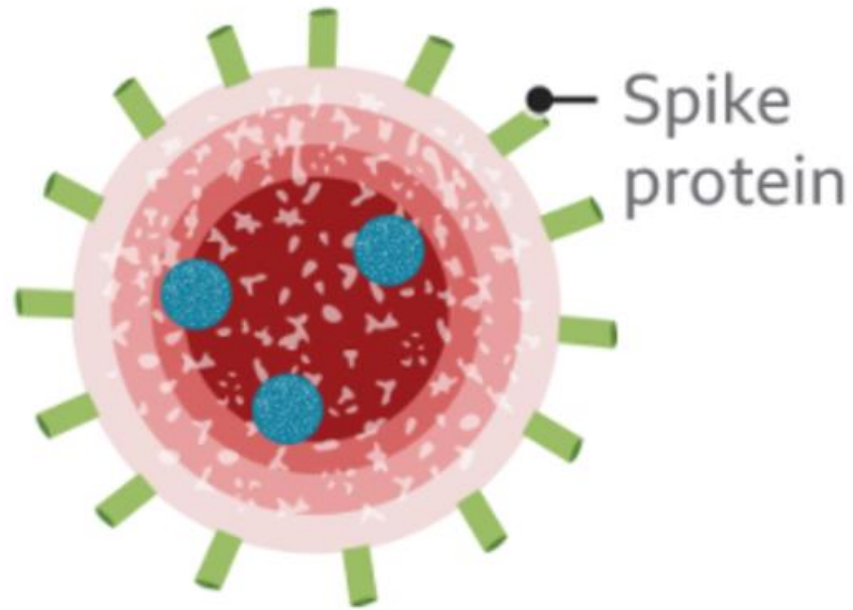


How an RNA vaccine works

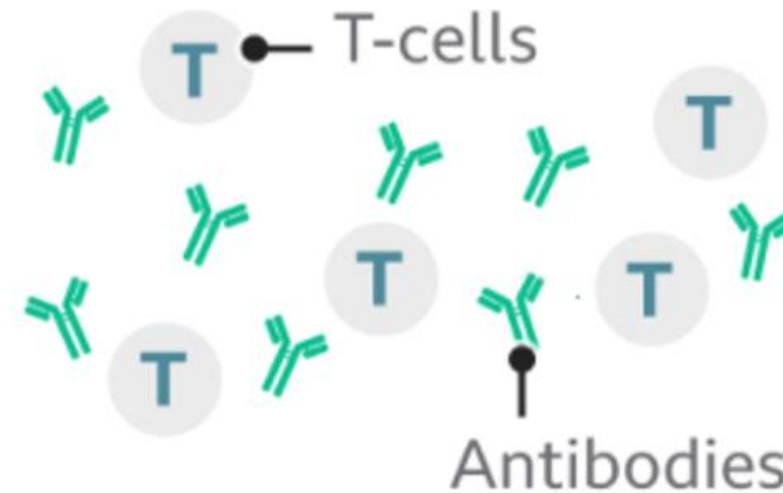
- 1 Scientists take part of the virus's genetic code and turn it into a vaccine that is injected into the patient



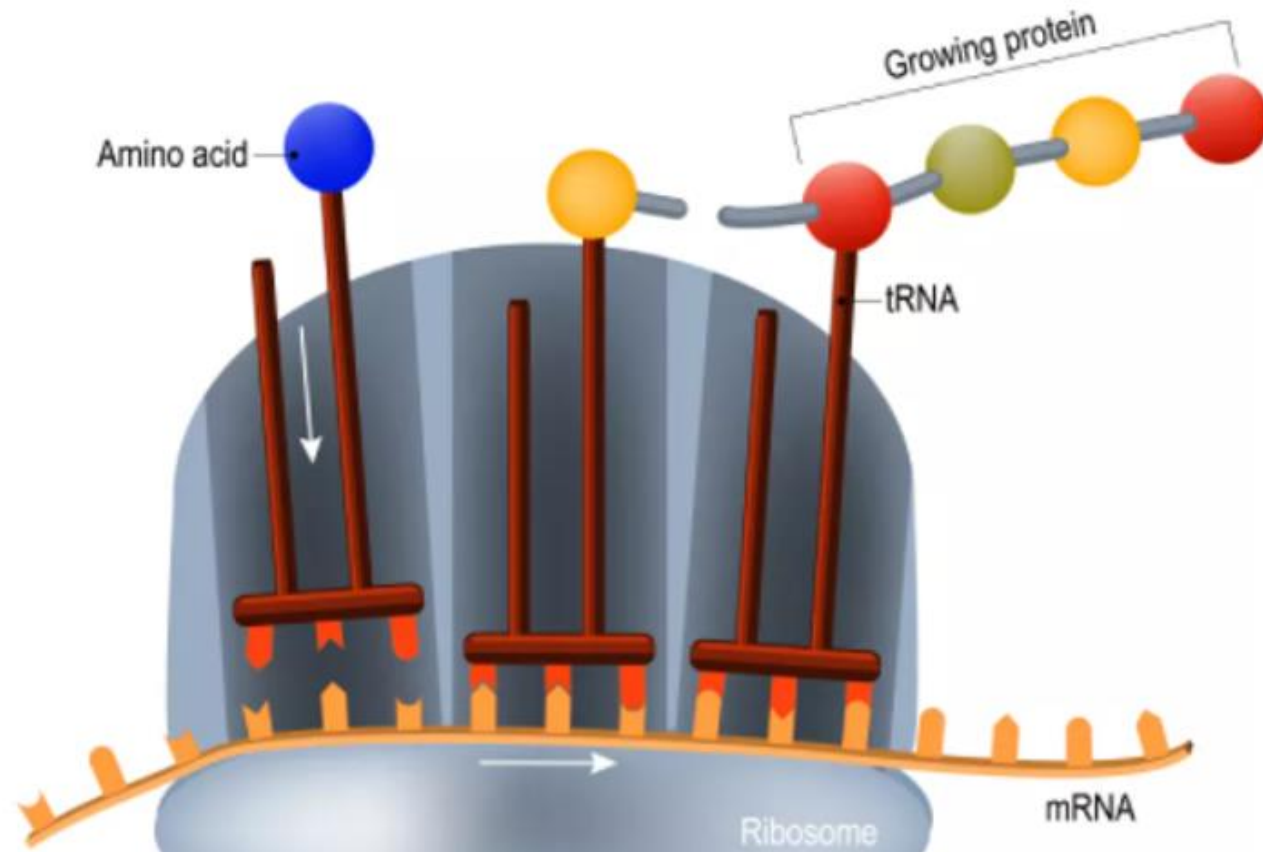
- 2 The vaccine enters the cells and tells them to produce the coronavirus spike protein



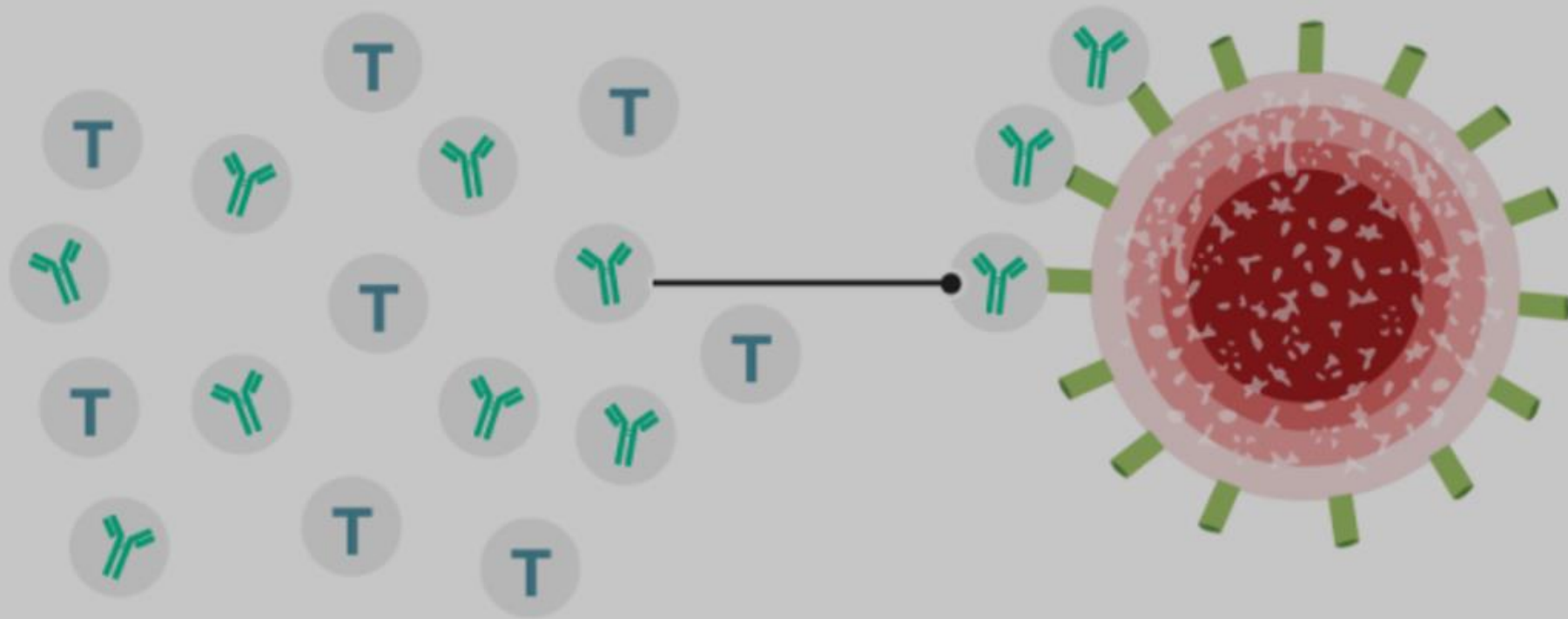
The body's immune system reacts, produces antibodies and activates T-cells to destroy cells with the spike protein



mRNA making a protein



- 3 If the patient later catches coronavirus, the antibodies and T-cells are triggered to fight the virus



Common Side Effects/Immune response reactions

The most commonly reported side effects, were pain at the injection site, tiredness, headache, muscle pain, chills, joint pain, and fever. Of note, more people experienced these effects after the second dose than after the first dose, so it is important for vaccination providers and recipients to expect that there may be some side effects after either dose, but even more so after the second dose.

PFIZER-BIONTECH LIST OF INGREDIENTS:

Each dose of the Pfizer-BioNTech COVID-19 Vaccine includes the following ingredients:

lipids (0.43 mg (4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate), 0.05 mg 2[(polyethylene glycol)-2000]- N,N-ditetradecylacetamide, 0.09 mg 1,2-distearoyl-sn-glycero-3-phosphocholine, and 0.2 mg cholesterol),

Buffers and stabilizers 0.01 mg potassium chloride, 0.01 mg monobasic potassium phosphate, 0.36 mg sodium chloride, 0.07 mg dibasic sodium phosphate dihydrate, and 6 mg sucrose.

The diluent (0.9% Sodium Chloride Injection, USP) contributes an additional 2.16 mg sodium chloride per dose.

Does not contain preservative. The vial stoppers are not made with natural rubber latex.

Moderna COVID-19 Vaccine Contains:

A total lipid content of 1.93 mg (SM-102, polyethylene glycol [PEG] 2000 dimyristoyl glycerol [DMG], cholesterol, and 1,2-distearoyl-sn-glycero-3-phosphocholine [DSPC]),

Buffers and Stabilizers-0.31 mg tromethamine, 1.18 mg tromethamine hydrochloride, 0.043 mg acetic acid, 0.12 mg sodium acetate, and 43.5 mg sucrose

Moderna COVID-19 Vaccine does not contain a preservative. The vial stoppers are not made with natural rubber latex.

A vaccine for everyone...find yourself in the Cove study



Interim data snapshot - October 21, 2020 - subject to change

moderna

1. CDC presentation slides

<https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2020-12/slides-12-12/COVID-03-Mbaeyi.pdf>

2. Frequently asked questions

<https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html>

3. New England Journal Article

[Covid-19 vaccine from Pfizer and BioNTech is strongly effective, data show](#)

4. Cove study

<https://www.modernatx.com/cove-study>

5. ACOG Recommendations for pregnant and lactating women

<https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2020/12/vaccinating-pregnant-and-lactating-patients-against-covid-19>